Non-Calculator

Q1.

Simplify $\dfrac{2\sin 45^\circ - \tan 45^\circ}{4\tan 60^\circ}$

Give your answer in the form $\dfrac{\sqrt{a}-\sqrt{b}}{c}$ where a, b and c are integers.

Answer ______________________________

(Total 4 marks)

Q2.

Show that 12 cos 30° – 2 tan 60° can be written in the form $\sqrt{k}$

where k is an integer.

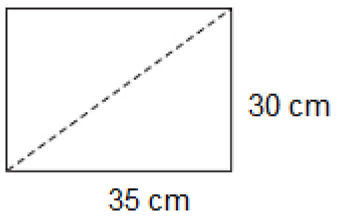
(Total 3 marks)

Calculator

Q3.

(a) The diagram shows a rectangle.

Not drawn accurately



Work out the length of the diagonal.

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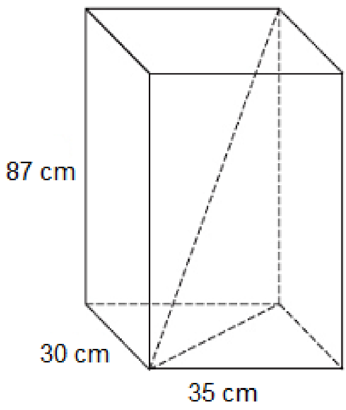
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Answer ___ cm

(3)

(b) The rectangle in part (a) is the base of this box.
The box is a cuboid.



Will a straight rod of length 1 metre fit in the box?
You **must** show your working.

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(3)
(Total 6 marks)

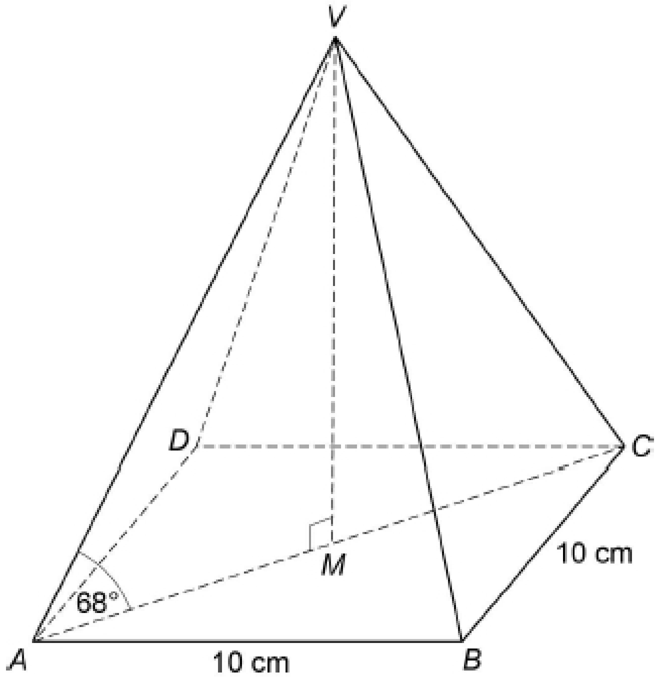
Q4.

VABCD is a square-based pyramid.

The horizontal base *ABCD* has side length 10 cm and centre *M*.

Angle *VMA* is 90°

Angle *VAM* is 68°



Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

Work out the volume of the pyramid.

Answer ______________________________ cm^3

(Total 6 marks)

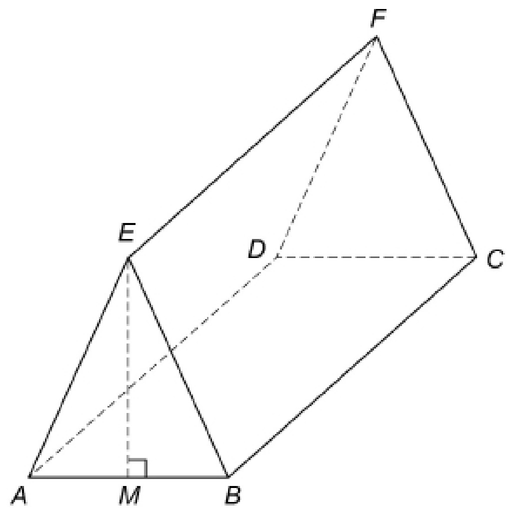
Q5.

Rectangle *ABCD* is the horizontal base of a triangular prism *ABCDEF*.

AE = *BE*

E is vertically above *M*, the midpoint of *AB*.

AB = 16 cm *AE* = 17 cm *BC* = 30 cm



(a) Show that *EM* = 15 cm

(2)

(a) Work out the size of angle *ECM*.

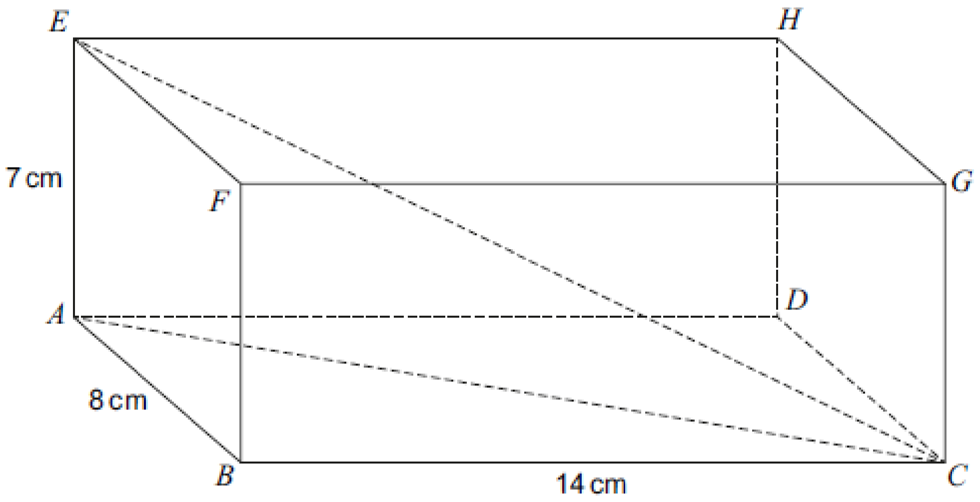
Answer ______________________ degrees

(4)

(Total 6 marks)

Q6.

ABCDEFGH is a cuboid.



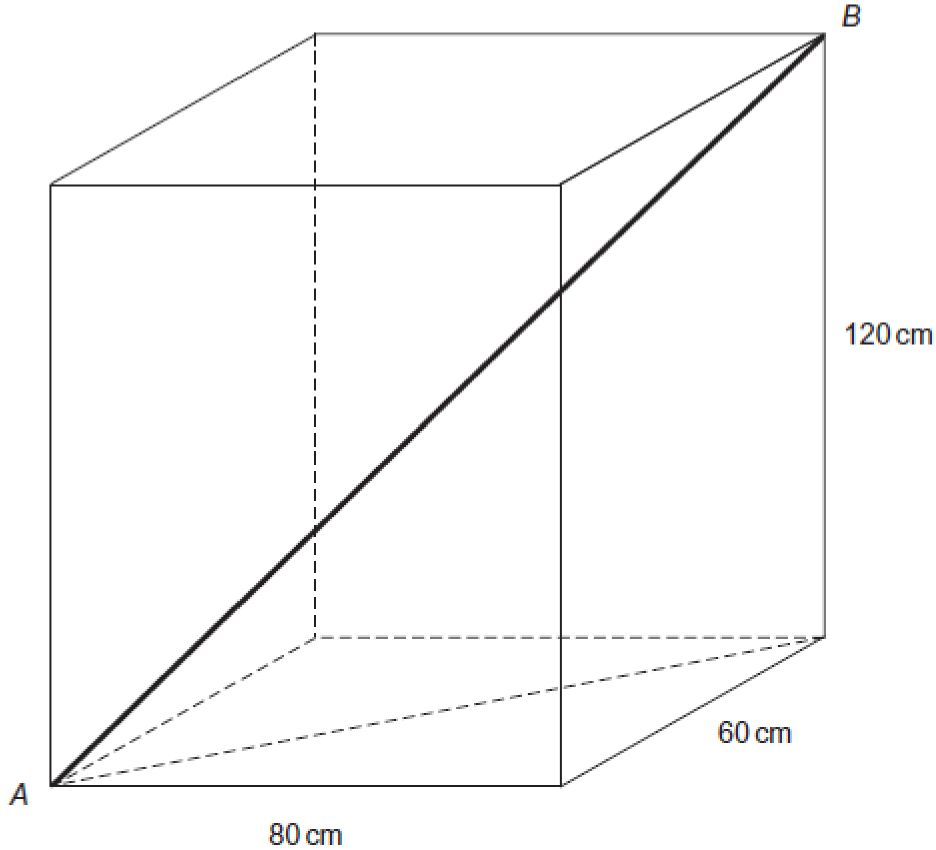
Work out the angle between *EC* and *ABCD*.

Answer____________________________ degrees

(Total 3 marks)

Q7.

A cupboard is in the shape of a cuboid.
A pool cue will just fit in the cupboard if it is placed diagonally as shown.



Work out the length of the pool cue, marked *AB* on the diagram.

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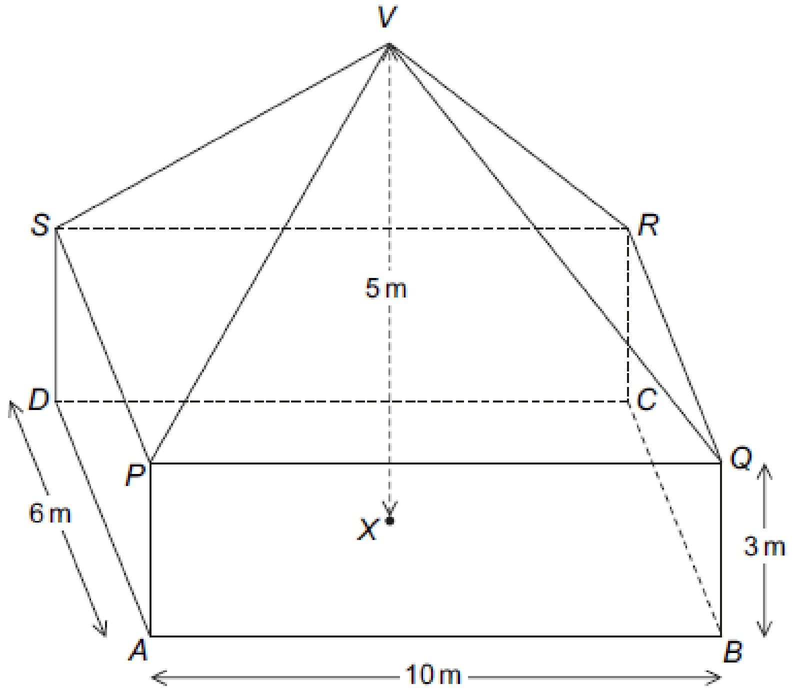
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Answer ____________________________________ cm

(Total 3 marks)

Q8.

The diagram shows a cuboid *ABCDPQRS* and a pyramid *PQRSV*.
V is directly above the centre, *X*, of *ABCD*.



The total height, *VX*, is 5 metres.

(a) Work out the angle between the line *VA* and the plane *ABCD*.

Answer ______________________ degrees

(4)

(b) Work out the angle between the planes *VQR* and *PQRS*.

Answer ______________________________ degrees

(2)

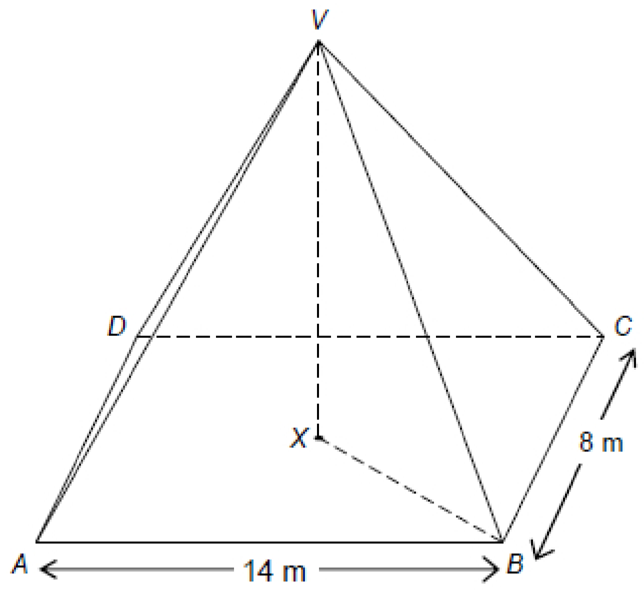
(Total 6 marks)

Q9.

Volume of a pyramid = $\frac{1}{3}$ × area of base × perpendicular height

VABCD is a rectangular-based pyramid with volume 336 m^3

X is the centre of the horizontal base, directly below *V*.



Work out the angle between *VB* and the base.

Answer ______________________ degrees

(Total 6 marks)

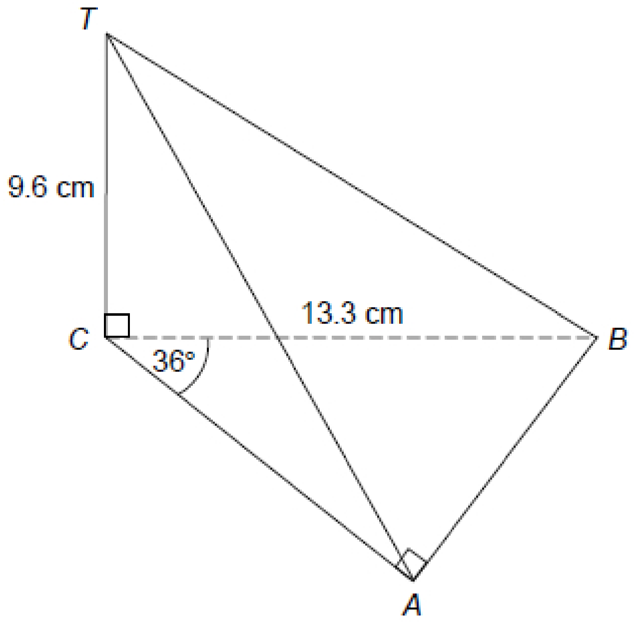
Q10.

This 3D diagram represents a paperweight.

The horizontal base *ABC* is a right-angled triangle.

CT is vertical.

Angle *ACB* = 36°, *BC* = 13.3 cm and *CT* = 9.6 cm.



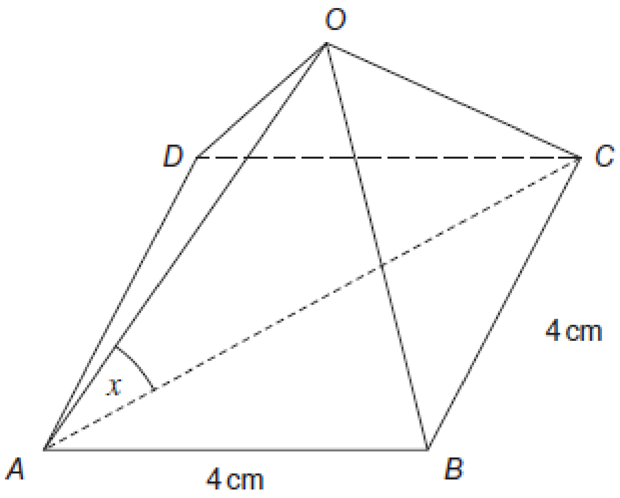
Work out the size of the angle between *AT* and the horizontal base.

Answer ______________________ degrees

(Total 4 marks)

Q11.

The diagram shows a square-based pyramid *OABCD*.



OA = *OB* = *OC* = *OD* = 6 cm
AB = *BC* = 4 cm

Work out the size of the angle between *OA* and the base *ABCD*, marked x on the diagram.

Answer ______________________________ degrees

(Total 4 marks)